



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/701,260	11/04/2003	Scott D. Brandenburg	DP-310095	6076
22851	7590	03/30/2005	EXAMINER	
DELPHI TECHNOLOGIES, INC.			NGUYEN, THINH T	
M/C 480-410-202			ART UNIT	
PO BOX 5052			PAPER NUMBER	
TROY, MI 48007			2818	

DATE MAILED: 03/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

EX

<b>Office Action Summary</b>	Application No. 10/701,260	Applicant(s) BRANDENBURG ET AL.	
	Examiner Thinh T. Nguyen	Art Unit 2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 February 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED OFFICE ACTION**

1. Applicant election of claims 1-12 without traverse for prosecution of the Application in the communication with the Office on 2/17/2005 is acknowledged.

#### **Specification**

2. The specification has been checked to the extent necessary to determine the presence of all possible minor errors. However, the applicant cooperation is requested in correcting any errors of which the applicant may become aware in the specification.

#### **Claim Rejections - 35 USC § 102**

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102(b/e) that form the basis for the rejections under this section made in this office action.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-3,9-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Culnane et al. (US patent 5,672,548) or Distefano (US patent 6,388,340).

Art Unit: 2818

REGARDING CLAIM 1

Culnane ( the abstract, fig 4,fig 5,fig 6) discloses a heat sinkable package, comprising:  
a power device package including an active side and a non-active side, wherein the non-active side includes a heat sinkable surface positioned adjacent to a product case.

Similarly, Distefano ( the abstract, fig 2, fig 5 ) disclose the same invention.

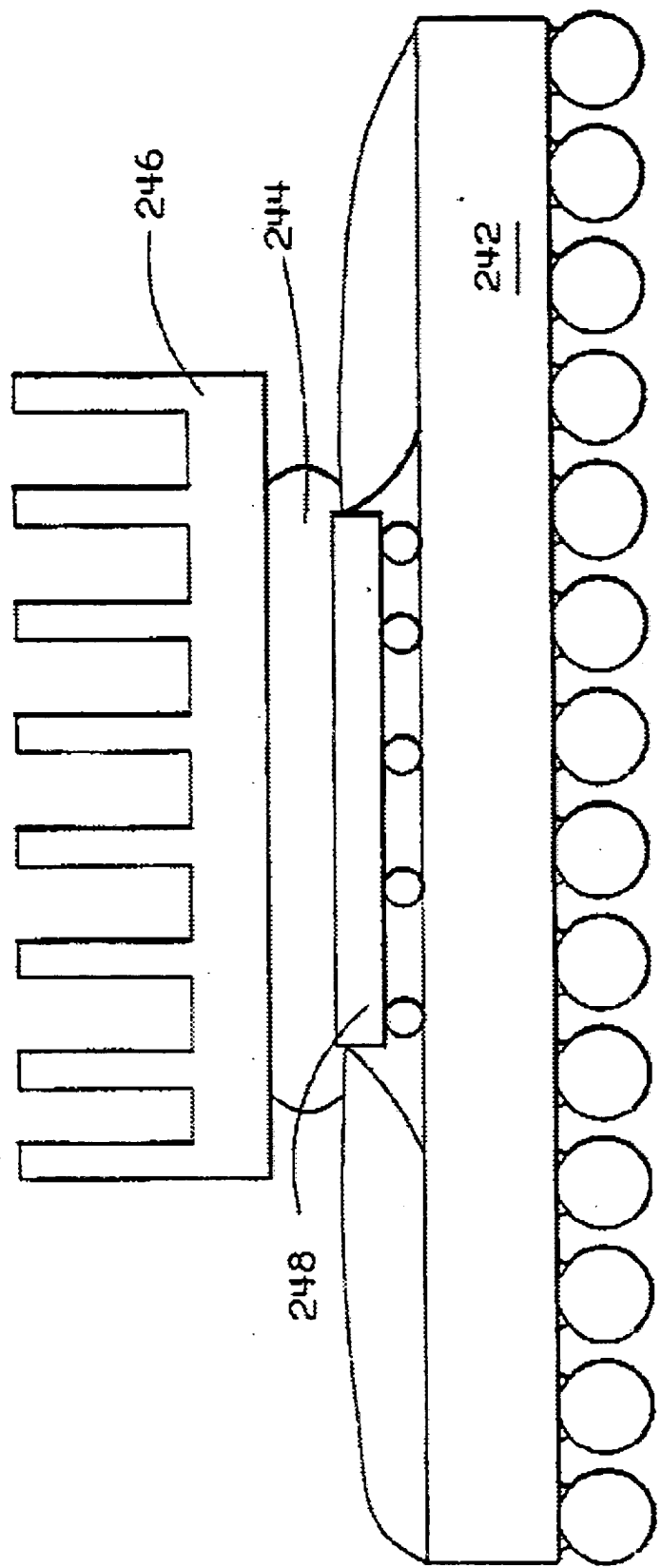


FIG. 4

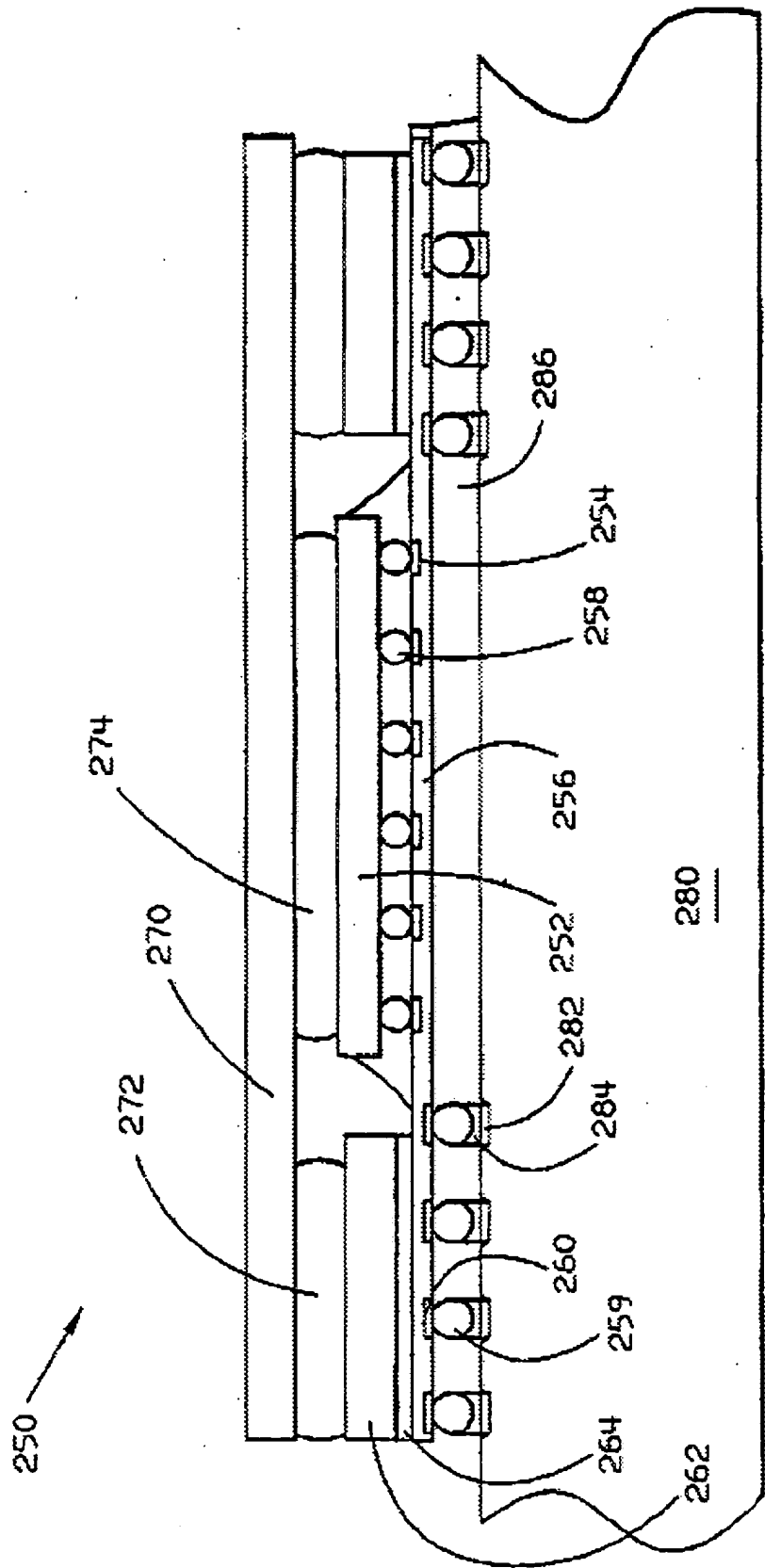
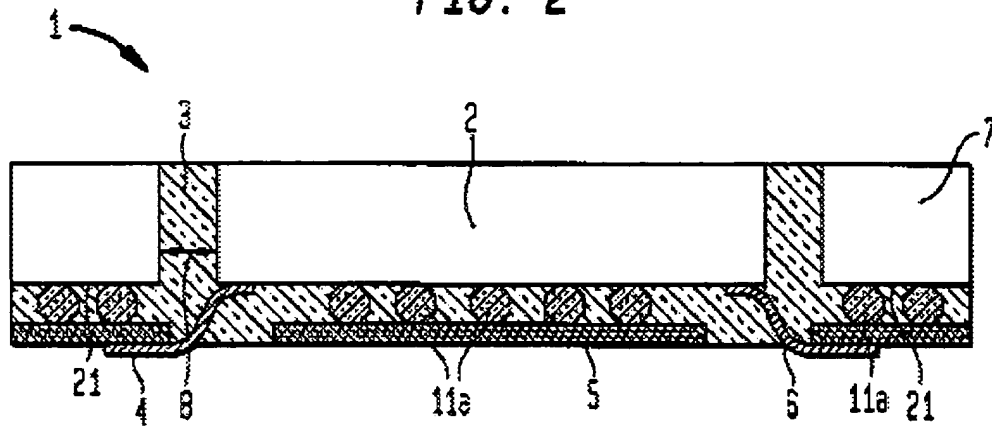
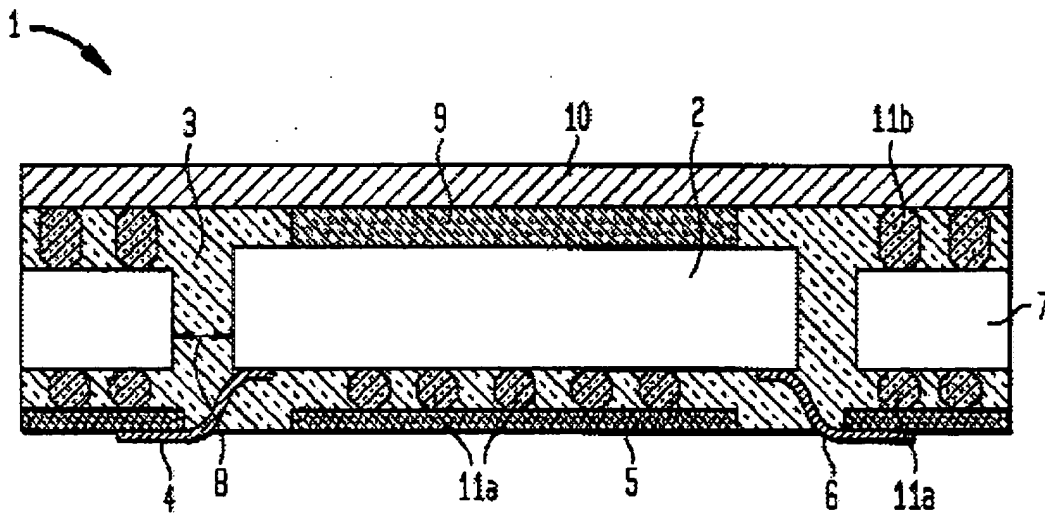


FIG. 5

**FIG. 2**



**FIG. 5**



REGARDING CLAIM 2,3

Both devices disclosed by Culnane ( fig 4,fig 5, the abstract line 9 ) and Distefano ( fig 2, fig 5) the abstract line 2 are flip-chip mounted on a flexible substrate.

REGARDING CLAIM 9

Both devices disclosed by Culnane ( fig 4,fig 5,layer 244,layer 274) and Distefano ( fig 5 layer 9 ) show a thermal interface located between the product case and the non-active side.

REGARDING CLAIM 10

Culnane ( in the abstract line 17-20 ) discloses the use of thermal conductive epoxy glue while Distefano discloses ( column 7 lines 59-67, columns 8 line 1-3) discloses the same invention.

REGARDING CLAIM 11

Culnane ( the abstract, line 6 ) and Distefano ( column 1 line 30 ) both disclose a BGA package.

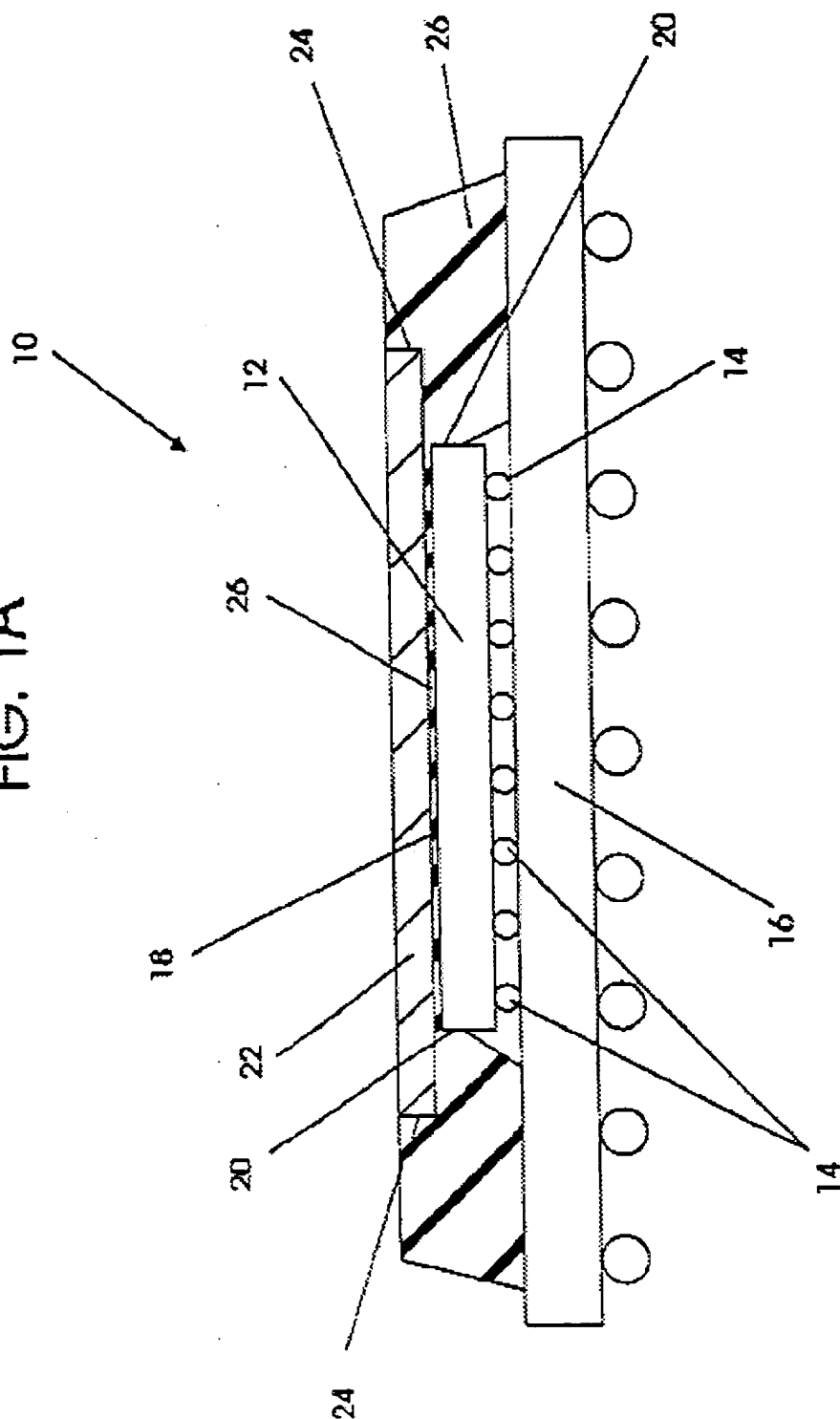
5. Claim 6 is rejected under 35 U.S.C. 102(b) as being anticipated by Johnson (US patent 5,883,430).

REGARDING CLAIM 6

Johnson ( in fig 1A, column 3 line 52-54) discloses a package that use underfill epoxy resin.



FIG. 1A



6. Claim 12 is rejected under 35 U.S.C. 102(e) as being anticipated by Lo et al. (US patent 6,507,120)

REGARDING CLAIM 12

Lo ( column 1 line 10, fig 8,) discloses a leadless QFP package.

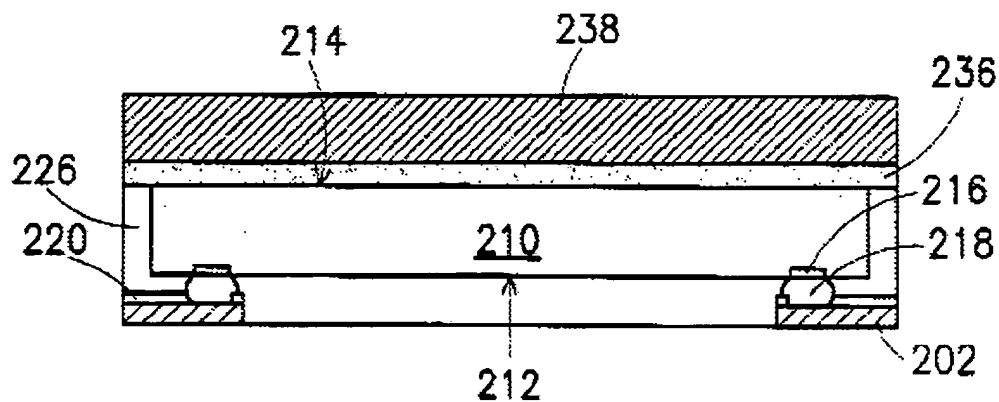


FIG. 8

**Claim Rejections - 35 USC § 103**

7. The following is a quotation of U.S.C. 103(a) which form the basis for all obviousness rejections set forth in this office action:

Art Unit: 2818

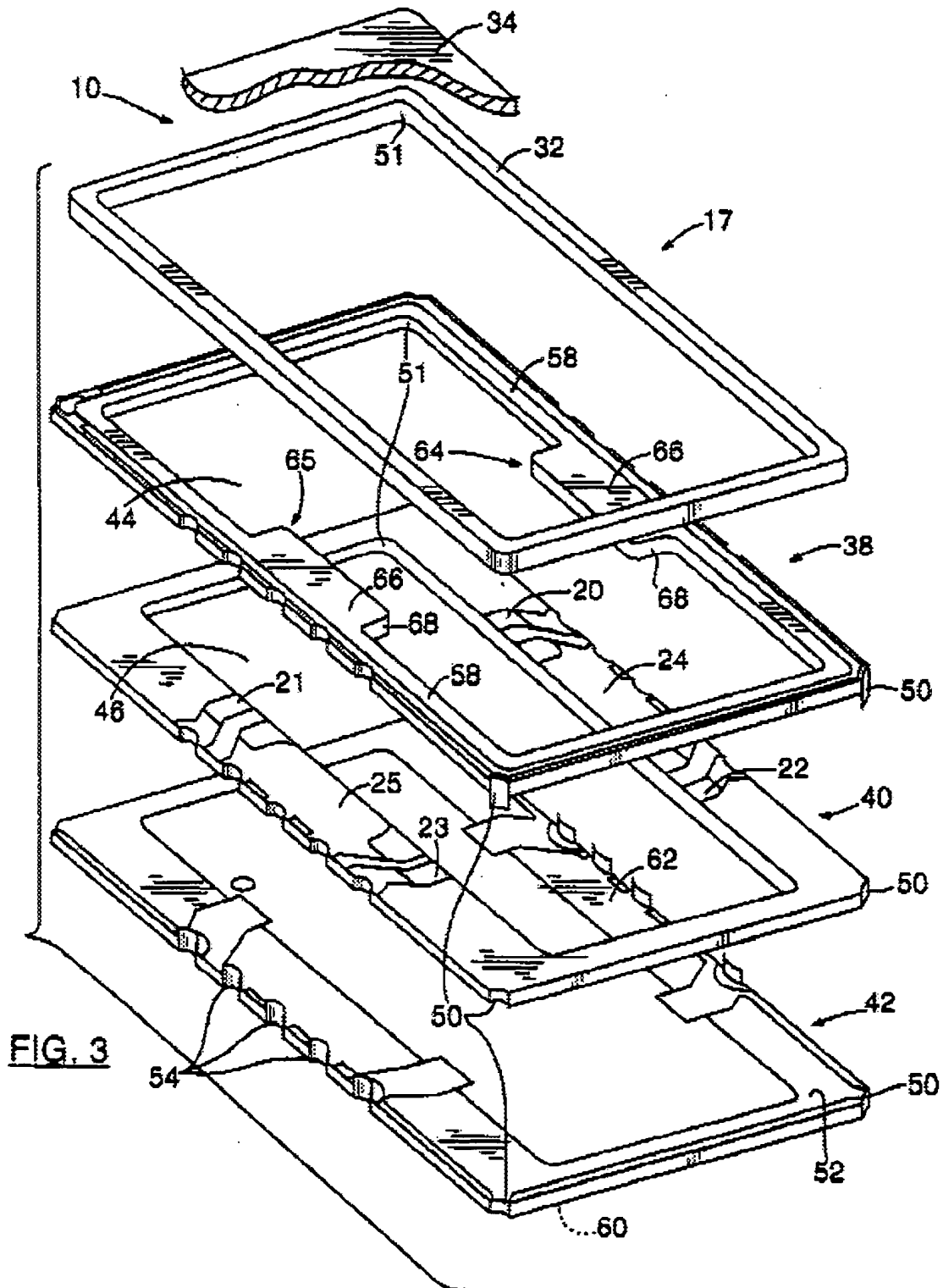
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

Patentability shall not be negated by the manner in which the invention was made.

8. Claims 4,5,8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Culnane et al. in view of further remark.

#### REGARDING CLAIM 4

Culnane discloses all the invention except for use of a ring carrier; this feature, however ; is old and well known in the art as shown by the Disclosure by Gore et al. (US patent 6,105,226) in fig 3 of their invention. A person skilled in the art at the time the invention was made would have been able to use a ring carrier on a substrate of the device invented by Culnane and come up with the invention of claim 4 without any special teachings.



REGARDING CLAIM 5

Culnane ( column 4 line 58-59) discloses all the invention including a substrate with copper and polyimide.

Missing in the disclosure by Culnane is the use of FR-4 material. This feature, however, is considered obvious since the use of FR-4 substrate is old and well known in the art as shown by the disclosure from Swiggett et al. (US patent 4,859,807) in column 19 line 56.

A person skilled in the art at the time the invention was made would have been able to use the FR-4 substrate in the Culnane invention and come up with the invention of claim 5 without any special teachings.

REGARDING CLAIM 8

Culnane ( the abstract, fig 1) discloses all the invention including a silicon chip and a leadframe and wire bond except for the use of gold ball wirings. This feature, however, is considered obvious since the use of gold balls wirings has become known in the art as evidenced by the disclosure by Akram (US patent 6,544,880).

A person skilled in the art at the time the invention was made would have been capable of using the teachings by Culnane and his ordinary design skills and come up with the invention of claim 8 for the purpose of improving the semiconductor device.

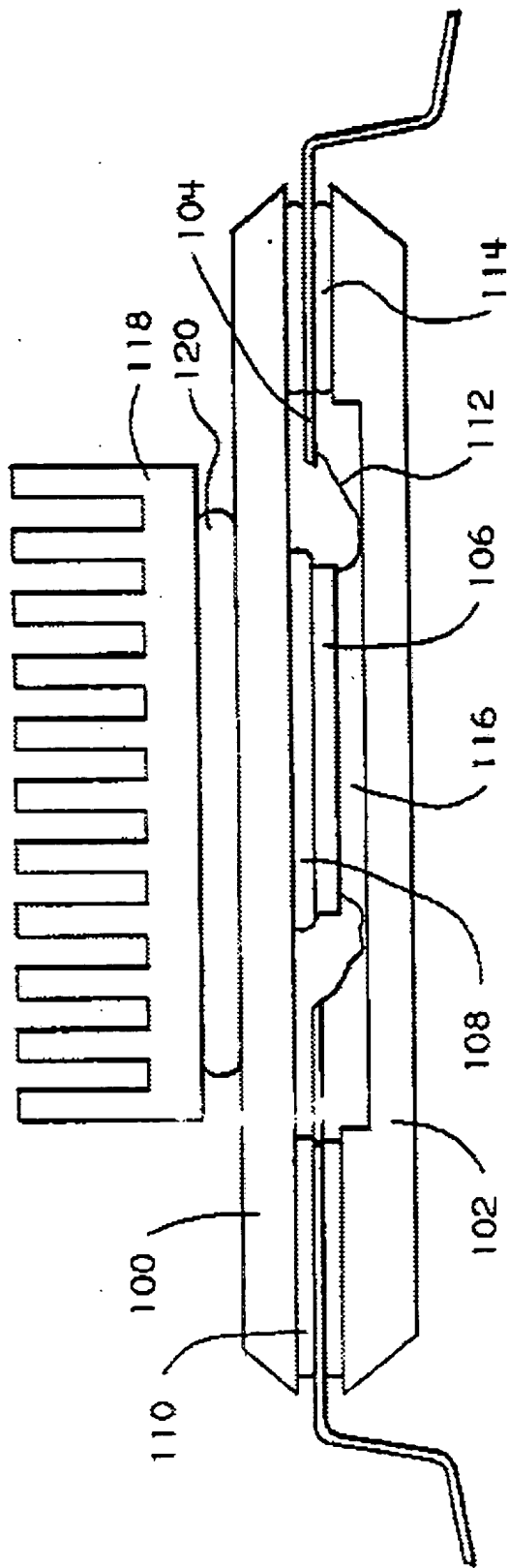
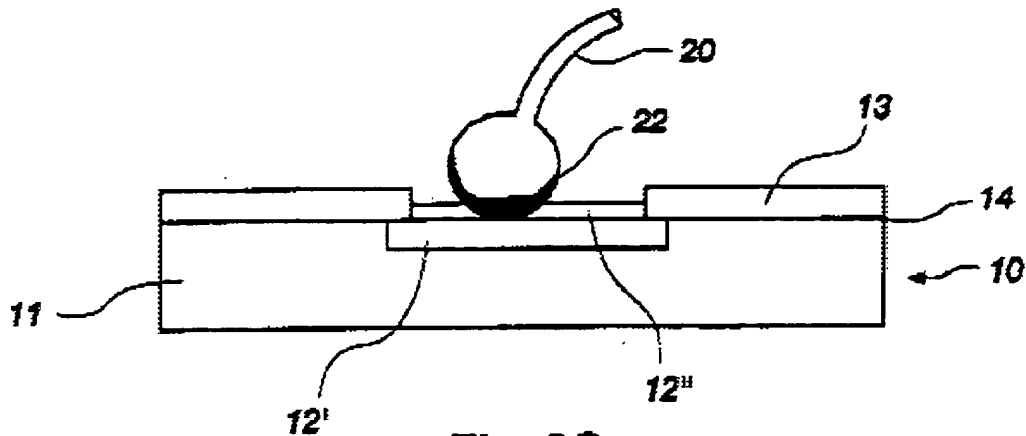


FIG. 1



9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson (US patent 5,883,430) in view of further remark.

#### REGRDING CLAIM 7

Johnson disclose all the invention except for the location of different passages for over molding and underfill. This feature, however, is considered obvious since it has been held that the provision for adjustability when needed , involves only routine skill in the art.

A person skilled in the art at the time the invention was made would have been capable of making provision for central and perimeter passages for over molding and underfill using the teachings by Johnson and his routine design skill and come up with the invention of claim 7 without any special teachings.

10. When responding to the office action, Applicants are advised to provide the examiner with the line numbers and the page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

11. A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to be abandoned (see M.P.E.P. 710.02(b)).

### **CONCLUSION**

12. The prior arts made of record and not relied upon are considered pertinent to applicant disclosure: Kato (US patent 6,486,562) discloses a circuit device with bonding strength improved and method for manufacturing the same.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thinh T Nguyen whose telephone number is 571-272-1790.

The examiner can normally be reached on Monday-Friday 9:00am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached at 571-272-1787.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306



Art Unit: 2818

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Thinh T. Nguyen



Art Unit 2818



David Helms  
Supervisory Patent Examiner  
Technology Center 2800